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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/708,242

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Ling-Yi Liu

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NORTH AMERICA INTELLECTUAL PROPERTY CORPORATION

P.O. BOX 506

MERRIFIELD, VA 22116

EXAMINER

RAY, GOPAL C

ART UNIT

PAPER NUMBER

2111

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/708,242	Applicant(s) LIU ET AL.	
	Examiner Gopal C. Ray	Art Unit 2111	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 January 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 169-297 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 169-297 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

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1. The examiner acknowledges the cancellation of claims 1-168 and addition of new claims 169-297 by the amendment filed on 1/23/07. Applicant's amendment with the request for reconsideration of the finality of the rejection of the last office action is persuasive and, therefore, the finality of the action is withdrawn. Claims 169-297 are presented for examination. The indicated allowability of claims 244-247 over the prior art is withdrawn in view of the newly discovered reference to Wilcox (US 6,532,547).
2. The specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.
3. Claims 169-297 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The examiner notes the following ambiguities. However, all claims should be revised carefully to eliminate all grammatical errors and antecedent basis problems.

All independent claims seem to have an antecedent basis problem, when it comes to the phrase "wherein when one storage virtualization controller in said redundant SVC pair is not on line or goes off line after being on line, the alternate storage virtualization controller in the said redundant SVC pair will automatically take over the functionality originally performed by the said one storage virtualization controller in the redundant SVC pair." Antecedent basis for "the alternate storage virtualization controller" is lacking. The use of "alternate" would imply one that is primary and one that is "the alternate". However, the claims have been drafted to only to specify

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a pair of SVCs without the primary and alternate designation. The specification seems to support two redundant configurations ("active-standby" and "active-active"), and thus "alternate" is unclear when interpreted in light of the specification. Since the claim specifies "when one" fails, then "alternate" should be replaced by "the other of the pair" as this would cover both redundancy schemes and provide proper antecedent basis (a pair only has two, so there is "one" and "the other").

All dependent claims incorporate the deficiencies of the respective parent claims.

4. The following is a quotation of 35 U.S.C. § 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 244-247 are rejected under 35 U.S.C. § 103(a) as being unpatentable over applicant's admitted prior art in view of US Patent 6,532,547 granted to Wilcox.

As per claims 244-245, "a redundant storage virtualization subsystem for providing storage to a host entity, comprising: a redundant external storage virtualization controller (SVC) pair for performing IO operations in response to IO requests issued by the host entity comprising a first and a second storage virtualization controller for coupling to the host entity". Here one can refer to prior art Figures 1 and 2 and the discussion of paragraphs 4-23. As shown in Figures 1 and 2 and paragraph 19, please refer to FIG. 1, where a block diagram of a conventional redundant external

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storage virtualization computer system is illustrated. Note that Figure 1 shows a host entity connected to SVC1 and SVC2, and the purpose of the SVCs per paragraph 5 is to: "IO requests received from the host system are parsed and interpreted and associated operations and data are translated into physical storage device IO requests"; "a set of at least one physical storage device for providing storage to the host entity, with at least one member of said set of at least one physical storage device comprising a PSD coupled to the said redundant storage virtualization controller pair through a point-to-point serial signal interconnect"; as shown in Figures 1 and 2, multiple PSDs are shown connected to the SVCs for providing storage to the host, thereby showing the "at least one set".

"Wherein when one storage virtualization controller in the said redundant SVC pair is not on line or goes off line after being on line, the alternate storage virtualization controller in the said redundant SVC pair will automatically take over the functionality originally performed by the said one storage virtualization controller in the redundant SVC pair".

This functionality comes straight from the admitted prior art paragraphs 10 and 11: "The primary motivation in configuring a pair of external storage virtualization controllers (SVCs) into a redundant pair is to allow continued, uninterrupted access to data by a host (or more than one host) even in the event of a malfunction or failure of a single SVC. This is accomplished by incorporating functionality into the SVCs that allow one controller to take over for the other in the event that the other becomes handicapped or completely incapacitated. On the device side, this requires that both controllers are able

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to access all of the physical storage devices (PSDs) that are being managed by the SVCs, no matter which SVC any given PSD may initially be assigned to be managed by. on the host side, this requires that each SVC have the ability to present and make available to the host all accessible resources, including those that were originally assigned to be managed by the alternate SVC, in the event that its mate does not initially come on line or goes off line at some point (e.g., due to a malfunction/failure, maintenance operation, etc.).”

Applicant’s admitted prior art does not show that “the coupling is via a “point to point serial signal interconnect and wherein said PSD is a SATA PSD” (claim 244) and “wherein said point-to-point serial signal interconnect is a Serial ATA IO device interconnect” (claim 245). However, the reference of Wilcox teaches a redundant peripheral device subsystem which is structurally the same as the instant invention. With reference to Figure 2, Wilcox discloses a single host entity 5 which is bus connected to redundant controllers 11, 12 which in turn are connected through N:1 switching to dedicated storage units 51-55. This is structurally identical to the invention shown by applicant’s Figure 3 and differs only in that the disk interface is SCSI rather than PATA or SATA as disclosed and claimed. Since SCSI, PATA, and SATA disk interfaces are well known in the prior art as equivalents for interfacing with disk storage devices, it would have been obvious to one of ordinary skill in the data processing art at the time of the invention to modify the applicant’s admitted prior art teaching to adapt for other types of available drive interfaces commonly used in the field of data storage.

As per claims 246-247, the claims are rejected for similar reasons as discussed in the rejection of claims 244-245 above.

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Applicant is urged to consider the references to Hoch et al., Johnson et al. and Bicknell et al.

In the same field of endeavor, Hoch et al. show in Figure 1, a SATA device 110 connected to a host 140 via the host adapter 130 and the point to point connection 120 per the SATA specification. Furthermore, it is highly desirable in a high-availability storage system, whereby redundant hosts and host adapters can be used to assure continued system operation even if one or more hosts fail.

The reference of Johnson et al. teaches in paragraph [0022] that the invention can be practiced with a variety of Message passing Technology (MPT) controllers, including Serial Attached Small Computer System Interface (SAS), Serial Advanced Technology attachment (SATA), Parallel Advanced Technology attachment (PATA), Fibre Channel (FC), Small Computer System Interface (SCSI) and the like.

The reference of Bicknell et al. teaches ATA, SATA and PATA interfaces in paragraph [0004].

If applicants are aware of any prior art better than those are of record, they are required to bring the prior art to the attention of the examiner. Applicants are also reminded that each individual associated with the filing and prosecution of a patent application has a duty of candor and good faith in dealing with the Office, which includes a duty to disclose to the Office all information known to that individual to be material to

patentability as defined in 37 CFR 1.56. Applicants are advised to submit any information material to patentability in accordance with 37 CFR 1.97 and 1.98.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gopal C. Ray whose telephone number is (571) 272-3631. The examiner can normally be reached on Monday - Friday from 8:00 AM - 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Rinehart, can be reached on (571) 272-3632. The fax phone number for this Group is (571) 273-8300.

Communications via Internet e-mail regarding this application, other than those under 35 U.S.C. 132 or which otherwise require a signature, may be used by the applicant and should be addressed to **[mark.rinehart@uspto.gov]**.

All Internet e-mail communications will be made of record in the application file. PTO employees do not engage in Internet communications where there exists a possibility that sensitive information could be identified or exchanged unless the record includes a properly signed express waiver of the confidentiality requirements of 35 U.S.C. 122. This is more clearly set forth in the Interim Internet Usage Policy published in the Official Gazette of the Patent and Trademark on February 25, 1997 at 1195 OG 89.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to TC central telephone number is (571) 272-2100.

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Moreover, information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Lastly, paper copies of cited U.S. Patents and Patent Application Publications ceased to be mailed to applicants with office actions as of June 2004. Paper copies of Foreign Patents and Non-Patent Literature will continue to be included with office actions. These cited U.S. Patents and Patent Application Publications are available for download via Office's PAIR. As an alternate source, all U.S. Patents and Patent Application Publications are available on the USPTO web site (www.uspto.gov), from the office of Public Records and from commercial sources. Applicants are referred to the Electronic Business Center (EBC) at <http://www.uspto.gov/ebc/index.html> or 1-866-217-9197 for information on this policy. Requests to restart a period for response due to a missing U.S. Patent or Patent Application Publications will not be granted.

Gopal C. Ray
GOPAL C. RAY
PRIMARY EXAMINER
GROUP 2100